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DUCATOR'S GUIDE

source and program guide for teachers

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TILDEN NATURE AREA

An outdoor Education Program in cooperation with School Districts of the East Bay

EAST BAY REGIONAL PARK DISTRICT

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AN EDUCATOR'S GUIDE TO THE TILDEN NATURE AREA

A Resource and Program Guide for Teachers

Recreation Training Eastbay ar

EAST BAY REGIONAL PARK DISTRICT

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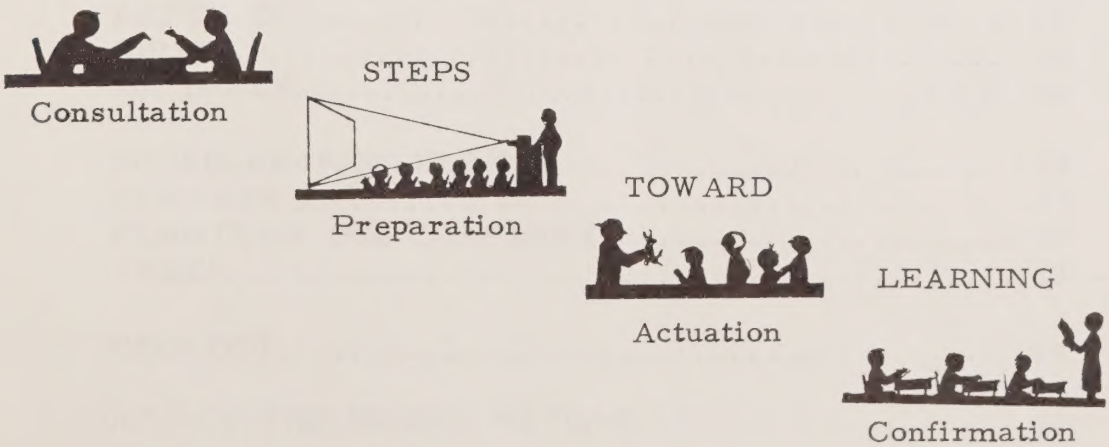

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WELCOME to the Tilden Nature Area

What is it? The Tilden Nature Area, consisting of about seven hundred acres of East Bay Regional Park land, is situated in the north end of Tilden Regional Park in the Berkeley Hills. Tilden comprises 2,065 acres of the 15,000 acres that make up the chain of parks within the East Bay Regional Park District. It is intended that this area shall remain somewhat in its natural condition for the purpose of study and observation of its environments, while other sections of the Park are developed for public uses such as picnicking, sports, and entertainment. Pupils to visit the Nature Area should be helped to understand the value and purpose of a natural area and their own responsibility for helping maintain it as they find it.

What is here? The Tilden Nature Area contains forest groves, brushy hillsides, grassy slopes, and two year-round streams. Each of these environments harbors a wide variety of plant and animal life. A focal point of the Area is a small reservoir called Jewel Lake. Another point of interest is Wildcat Peak, which rises 1250 feet above the San Francisco Bay.

Climate: The kinds of plants and animals in the Nature Area are influenced by its "Foggy Mediterranean Climate." Heavy frosts are rare and winter is a period of active vegetation. This area, so near the coast, is warmer than the interior areas in winter, although morning fogs from the ocean frequently reduce the temperature somewhat.

Operation: The school tours and nature study programs are operated and administered by the staff of the Interpretive Department of the East Bay Regional Park District. Coordination of the school programs is accomplished through the cooperative efforts of a committee of representatives of the participating School Districts.

School field trips: Days for school field trips to the Tilden Nature Area are allotted to the participating school systems in proportion to their average daily attendance during the preceding year. Coordination between the school districts and the Regional Parks' nature education program is handled by the naturalists' office at the Tilden Nature Area (call School Program Coordinator at 524-1034). It is recommended that each teacher confer with the Program Coordinator by telephone (or by means of a personal visit if desired) at least 10 to 20 days before the scheduled trip.

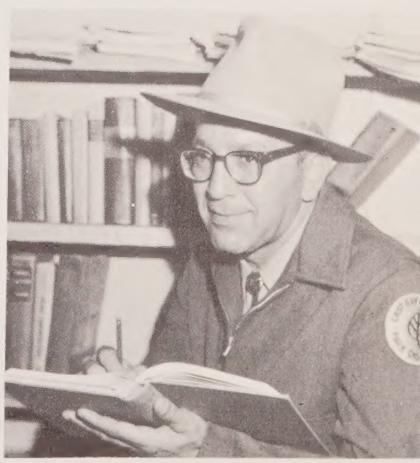
This Educator's Guide can assist you in many ways towards accomplishing a successful outdoor experience with your students. Additions and/or corrections to this manual will be provided at the start of each school year. We are grateful to Mr. Sylvan H. Wall and Mr. Herbert H. Wong of the Oakland School District for their assistance in compiling sections of this information over a period of many years.

READY TO SERVE YOUTH

CHRISTIAN NELSON, CHIEF, INTERPRETIVE DEPT.
"Chris" serves the school program primarily as a coordinator and planner. He works directly with the school committee and the superintendents to assure that the needs of the curriculum, the children, and the teachers are being met. Chicago was home to him for many years until he left to secure his B.S. Degree in science at Michigan State University. A Graduate Fellowship and an M.S. Degree from Oregon State University brought him west. The California Conservation Council Merit Award and the Elsie M. B. Naumberg Award as the outstanding Children's Museum Director in the United States in 1961, highlighted his seven years of working with children and nature as Executive Director of the Sacramento Junior Museum. He accepted his present position in October of 1962.

MISS MARGERY HUTCHISON, NATURALIST AIDE.
"Marge" is outstandingly well qualified to coordinate the Regional Parks' school nature program. After graduation from UCLA, she worked five years in the outdoor education programs of San Diego and other Southern California school districts. She also taught fourth grade and gained valuable experience in children's recreation work. Her role with the Park naturalists is primarily in educational planning and nature publications. Teachers will enjoy working with Marge.

JOSHUA BARKIN, NATURALIST "Josh" has been a naturalist at Tilden for three years. He is known by many for his exciting nature tours. Prior to completing his studies at the University of California, he gained valuable experience at the Bear Mountain Trailside Museum and the Brooklyn Museum. Acting as nature study consultant to the Diablo Press and the East Bay Activities Center, as well as being a member of the Audubon Society, the Wilderness Society, and other conservation organizations keeps him busy during his "off hours." He completed three years of radio nature study programs for children on "Forest Lore" and received the Latham Foundation Award for Humane Education in 1963. No youngster loses interest while on the trail with Josh.



RICHARD ANGEL, NATURALIST. "Dick" brings to our program a rich experience in nature and youth work. After graduating from Oregon State University, he worked with the Fish and Wildlife Service, the San Francisco YMCA Camp, and the California Division of Fish and Game. For two years he was naturalist for the Santa Clara County School Camping Program. He also spent five years teaching high school biology and general science. Outdoor education being his "first love", he is happy to have returned to the "biggest classroom in the East Bay."

Field Trip Guidelines

The outdoor education experience for a school class will achieve its fullest educational purpose only as the teacher plans carefully and confers closely with the Program Coordinator at the Tilden Nature Area. Each field trip is intended to have a particular emphasis related to the study areas currently being covered in class and the needs recognized by the teacher for the direct contact a field experience can give his or her group.

It is expected that this outdoor study emphasis will most naturally be found in one (or more) of the following fields: wildlife, plant life, geology, conservation. Tied in with any nature study trip will be consideration of the effects of weather and climate; a visit to the Nature Area weather station may be made by any class group with special weather interest. Another possible sidelight to the field trip is a tour of The Little Farm for an introduction to typical domesticated animals and their relation to wild animals and to man.

The field approach of the Regional Parks naturalists is always from the ecological angle, stressing the interrelationships between all aspects of the natural world.

THE OUTLINE BELOW PRESENTS THE FOLLOWING IMPORTANT GUIDELINES TO A SUCCESSFUL FIELD TRIP:

I. Relating the outdoor and classroom programs
II. Getting the most out of the trip itself
III. Equipment to bring
IV. Behavior Standards

I. Relating the outdoor and classroom programs

Below are some specific suggestions of possible ways to tie in the Tilden field trip with the classroom curriculum. The teacher should be selective in use of these ideas, adopting only those which will make the interrelationship a natural aspect of the particular classroom situation in question.

A. Pre-trip experiences*

1. Science
   a. In whatever science unit is currently being studied, bring out relationships to the area of emphasis you wish to pursue on the Tilden trip: PLANT LIFE, WILD LIFE, GEOLOGY, or CONSERVATION.

*Many of these suggestions may be as useful post-trip as pre-trip.

b. Show films which will expand understandings in the study area chosen (see back of this handbook for film listings).
c. Show kodachrome slides of the Tilden Nature Area (available from the Audio-Visual Education Department). Observe the types of natural environments shown there, discussing how they are different from each other and the possible reasons (elevation, exposure, presence or absence of water) and predicting the kinds of animals and plants probably found in each.
d. List problems or questions which the field trip may help to clarify.
e. Plan ways to record observations and findings in the field (notes, sketches, charts).
f. Refer to Curriculum Guide, "Learning Through Excursions," Chapter V, Science. (Oakland School District only).

2. Social Studies
   a. Study the Costanoan Indians or other local tribes, particularly food and living habits.
   b. Study the history of the Regional Parks, how and why they were formed, how they are supported, and why they are important to people of the East Bay Cities. Learn why natural areas are needed and the responsibilities of the individuals visiting them.
   c. Find out, and perhaps make maps of a good route from school to Tilden Park.
   d. Discuss good outdoor manners (see Behavior Standards, #IV under FIELD TRIP GUIDELINES).
   e. Refer to Curriculum Guide, "Learning Through Excursions," Chapter IV, The Social Studies. (Oakland School District only)
3. Language
   a. Write letters to parents, each child telling what he expects to get out of the Tilden trip and asking for permission to go.
   b. Read stories of the animals, the Indians, and the Spanish and American settlers in the California wilderness (of which Tilden Nature Area is a reminder).
4. Arithmetic
   a. Find out how many miles it is to Tilden Nature Area and figure out how long the trip will take each way.
   b. Find out bus rental cost and compute expense to the school for transportation for the class and for each child.
5. Art
   Bring in beautifully patterned insects, rocks, wood, or interesting leaves, flowers, grasses, etc., to draw or paint (sharpening faculties of observation and opening appreciation of natural beauty).

B. Post-trip experiences*
   1. Science
      a. Examine the field observations and discoveries made; see which predictions were fulfilled and questions answered; compile this data. List questions still unanswered and new ones stimulated by the trip; plan ways to pursue them and to successfully complete the science studies related to the field trip.

*Many of these suggestions may be as useful pre-trip as post-trip.

b. Find out about other wildlife refuges or natural areas; discuss why such areas are needed in America and how individuals can help promote them.

c. Discuss the natural resources which are being preserved in areas like the Tilden Nature Area, the difference between preservation and conservation, and where and why natural resources are used (rather than preserved) throughout the Nation. An excellent introduction to a conservation unit.

d. Examine the school grounds for evidence of erosion or other anti-conservation factors; with proper official permission, undertake a remedial project.

e. Make a plant map of the school yard, discovering what plant-animal communities exist there; make studies of natural interrelationships and of effects of man's influence. What effects of man's influence were seen at the Tilden Nature Area?

f. Do some experiments or observations related to science learnings from the field trip, such as:
   (1) Plant growth study, noting effects of changing environmental factors (moisture, soil type, sunlight, etc.)
   (2) Soil observations, using a six to nine inch cube of soil placed in the classroom
   (3) Watershed experiments, using models of healthy and unhealthy watersheds and observing effects of running water on each.

g. Make a geological model of the Bay Area, showing mountain ranges, drainage systems, fault lines, etc., and finding out how they occurred.

h. Make a bird feeding station outside the window; on a large calendar insert the names of birds as they are first seen at the station (or elsewhere in the schoolyard), and check off each week that a bird remains; have the silhouette of his family posted where all can see and discuss his food habits as related to physical structure. This silhouette study can be continued with other bird families not in the local area, if desired.

i. Study bird nests
   (1) Carefully pull apart a nest and list materials found in it; then try to reconstruct the nest!
   (2) Put a nest in a pot of soil, keep it watered, and record each thing that sprouts.

   Note any relation of nest materials to food habits of the bird, and of nest structure to location.

j. Select birds or animals which were seen (or evidence of which were seen) at Tilden, and do individual research reports.

k. Have quiz games to test learnings from the field trip.

l. Read current and old issues of Tilden Nature News.

2. Social Studies

a. Study Indian and pioneer uses of plants seen in the Tilden Nature Area.

b. Do research on local and State resource problems (using newspapers and magazines as well as textbooks). Find out about potential urban growth and freeway systems in the Bay Area and

how resources will be affected. Learn what has occurred in the last thirty years.

3. Language
   a. Learn to spell new words learned on the field trip.
   b. Express impressions or learnings from the trip in writing reports, stories, or poems or appreciation letters to the naturalists at the Nature Area (address: Tilden Nature Area, Berkeley 8, California).
   c. Continue reading on wildlife, human settlement, conservation, and related problems.
4. Arithmetic
   a. Check pretrip calculations on distance and cost of the Tilden trip.
   b. Trace your hike on a Tilden map and estimate distance.
5. Art
   a. Make murals or dioramas of the wildlife communities studied at Tilden (riparian, aquatic, woodland, grassland) and possibly of other types not seen but studied through research.
   b. With the help of research materials, draw some of the birds or animals learned about at Tilden as they would appear in their hidden homes.
   c. Illustrate the writings done under Language (above).

II. Getting the most out of the trip itself

A. On the bus
   1. During the ride to Tilden Park, points of interest along the bus route can be pointed out:
      a. the view of San Francisco Bay
      b. the bridges
      c. the neighboring cities
      d. Mt. Tamalpais
      e. Summit Reservoir (used by the East Bay Municipal Utility District to store filtered water for Berkeley Hills residences)
   2. Within the Park itself are varied land forms and environments which the children can see from the bus:
      a. Land forms: hills and canyons
      b. Natural environments: grass lands, brushy hillsides, pine groves, eucalyptus groves, moist stream woodlands

B. In the field
   1. Maintain a high level of interest yourself--it is very infectious.
   2. By promoting quiet and keeping the group compact, make sure that everyone can hear and see the naturalist when he is speaking.
   3. Arrange opportunities for the pupils to experience the natural world with all of their senses. What can they see, hear, smell, taste, and touch?
   4. Arrange opportunities for the children to ask questions, record observations, take photographs, and discuss special interest situations discovered in the field.

III. Equipment to bring

A. Everyday clothing and comfortable shoes are recommended. A wrap is usually necessary. Bring rain gear when needed.
B. Pupils must bring lunches (but no bottles or canteens, please).
C. Pupils should not bring money, as there are no stores or vendors in the vicinity of the Nature Area. Neither should they bring radios, which divert attention from the purpose of the trip.
D. Notepads for jotting down observations and questions will be valuable. Lists of plants and animals are useful for checking off items seen on the trails.
E. Field glasses and/or cameras are useful, but are the responsibility of the owner.

IV. Behavior standards

A. On the bus
1. Choose a seat and remain in it during the entire ride.
2. Keep head and arms inside the bus for safety.
3. Converse in normal tones.
4. Do not disturb the bus driver.

B. In the Nature Area
1. Upon leaving the bus, wait in line with assigned partners until a naturalist arrives to lead the group.
2. Enter the Area as quietly as possible so that the maximum field trip results will be insured.
3. Remain on well-defined trails and roads.
4. As a precaution against accidents, do not pick up sticks and stones.
5. No plant, animal, or mineral specimens may be taken from the Nature Area.

C. At lunch
1. Unless the weather is prohibitive, lunch will be eaten outdoors, the morning class finishing by 12:00 and the afternoon class beginning lunch upon arrival.
2. Each class must remain in a group during the lunch period.
3. Each class must leave the lunch area clean, using the waste cans for all refuse.

APPOINTMENTS:

Only one class from any one School District may be scheduled for a morning or afternoon period. However, two classes, one each from different School Districts, may schedule for a morning or afternoon period, Tuesday through Friday. All appointments for field trips are arranged through the office of the Director of Elementary School Education. All appointments will be kept regardless of the weather. All-weather trails have been installed and adequate programs have been designed to maintain activity within the present "Nature Lodge" in case of heavy rains. In the event that a group is completely confined indoors during days of continued heavy rains, they may be given an opportunity to return at a later date if the schedule permits.

CANCELLATIONS:

In the event that a scheduled group finds it impossible to come due to the absence of the teacher or other cause, two steps should be taken. (1) The bus should be cancelled according to the procedure for your District (2) The Tilden Nature Area Staff should be notified by calling 524-1034.

TRANSPORTATION:

Bus transportation from the school to the Nature Area and return is provided at no cost to the pupils. The schedule is as follows:

Morning excursion. Leave the school at 8.30 a.m. Leave Tilden Park Nature Area to return to the school at approximately 12.00 noon.

Afternoon excursion. Leave the school at 11.30 a.m. Leave Tilden Park Nature Area to return to the school at approximately 2.30 p.m.

The bus schedule will be arranged through the Superintendent's office.

PERMISSION FOR EXCURSION:

Permission of parents must be secured in advance for each child; otherwise pupils must remain at school. Permission to take a trip outside your school district should be arranged through your Superintendent's office.

POISON OAK:

Pupils who are unusually susceptible to poison oak should be warned that, while reasonable precaution is taken to protect pupils, the complete eradication of poison oak is impossible in a Nature Area. The parents may prefer that such children remain at school on the day of the excursion. All children should be told how to wash thoroughly with soap and water after exposure to poison oak to avoid the rash. Well designed and maintained trails have largely eliminated this problem.

FIRST-AID KIT:

A first-aid kit must be in the possession of the teacher or immediately available while she is conducting an excursion. (Rule of the State Board of Education).

POND LIFE

A peaceful pond is a most exciting place to visit. Plants and animals live on different levels, from the sunny surface of the water to the murky bottom mud. These plants and animals have special adaptations for life in the water.

When you sit quietly by a pond, you will see, on the surface, bugs, beetles, and other insects moving about. They float because the surface of the water acts as a "skin", preventing them from sinking.

Below the surface, there is a tremendous struggle for survival, because the creatures living there are all predators - and everything in a pond is good eating. Life in a pond is based on Plankton, the microscopic animals and plants which float in the water as far down as light can penetrate. Insects, worms, fish, amphibians, reptiles, and birds form links in the food chain of a fresh-water pond.

Common Plant and Animal Life Associated with Jewel Lake

Invertebrates

Insects

Dragonflies
Mayflies
Damselflies
Mosquito
Water Strider
Water Boatman
Backswimmer
Diving Beetles
Giant Water Bug
Springtail

Worms

Nematodes
Planaria

Vertebrates

Stickleback Fish
Red-Legged Frog
Yellow-legged Frog
Bullfrog
California Newt
Western Pond Turtle
Western Garter Snake
Mallard Duck
Coot (Mud hen)

Plants

Algae
Duckweed
Sedges
Rushes
Cat-tail

Microscopic Life

Plants

Diatoms
Desmids

Animals

Protozoans
Flagellates
Rotifers

Recommended Printed Material:

Frasier, George. How and Why, Book 66. California State Series, 1944
Kane, Henry B. The Tale of the Pond. Alfred Knopf, 1960.
Huntington, Harriet E. Let's Go To The Brook. Doubleday, 1952
Huntington, Harriet E. Let's Go Outdoors. Doubleday, 1939

Youngsters are always thrilled to see the unfamiliar and the unusual in the animal world. A child's first look at a big Banana Slug is certainly a memorable moment. Some of the more prominent creatures which can often be seen, especially during wet weather, are listed below. Often referred to as "lowly creatures," it should be emphasized that as humble as they may appear, they play an important role in the total relationships that exist between animal to animal, animal to plant and, as in the case of the earthworm, even animal to soil.

Species	Where Seen
Oligochaeta Earthworms	Rainy season everywhere
Mollusks	
Land Snail	Moist places all year
Water Snail	At Jewel Lake
Banana Slug	Moist places

Printed Materials for the Teacher

* Science Guide for Elementary Schools:
Culbertson, A. E. How Living Things Get Air. October, 1936

Printed Materials for Children

Earthworms

* Hogner, Dorothy. Earthworms (3-4). Crowell, 1953

* Parker, Bertha M. The Garden and Its Friends (4-5). California State Series, 1959. "Friends of Our Gardens," pp. 31-32

Thurber, Walter A. Exploring Science, Four. Allyn, 1960. "Animals that Live in the Soil," pp. 210-214

Mollusks

* Blough, Glenn O. An Aquarium (3). California State Series, 1959 Snails, pp. 26-31

Frasier, George W. et al. Science Problems (6). Singer, 1959. "How Mollusks Live," pp. 223-224

*Materials available in every elementary school

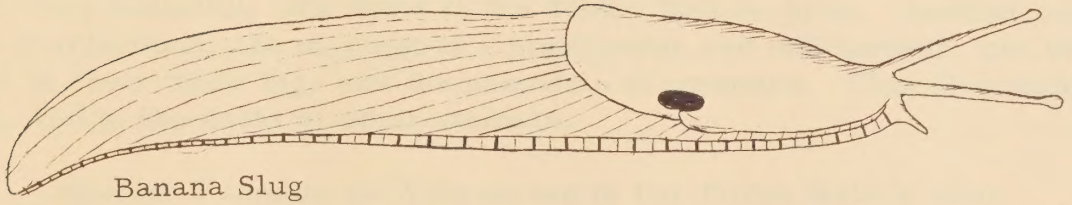
Miscellaneous Animals (Cont'd)

*Hogner, Dorothy. Snails (4-5). Crowell, 1958

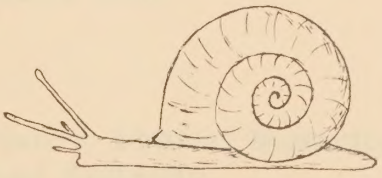
*Schneider, Herman and Nina. Science Far and Near (3). California State Series, 1959. "Snails in the Aquarium," pp. 176-177
Thurbur, Walter A. Exploring Science, Four. Allyn, 1960. "Animals that Live in the Soil," pp. 210-214

Audio-Visual Materials

Filmstrips:	Air and Life, gd. 3 up
	Animal Life and the Soil, gd. 5 up
	Animals Help Us, gd. 3 up
	How Soil is Formed, gd. 5 up
	Keeping an Aquarium, gd. 5 up
	Soil and Its Uses, gd. 3 up
Motion Pictures:	Life in an Aquarium, 10 minutes, gd. 3 up
	Pond Life, 11 minutes, gd. 4 up
	Wonders in Your Own Backyard, Kdgn. up



Banana Slug



Land Snail

*Materials available in every elementary school

The Class Insecta or insects have been given their name from a Latin word meaning they are almost cut in two parts, the head and the rest of the body. The insect has its skeleton on the outside of its body and belongs to the arthropods, which are among the most common invertebrate animals. There are more different kinds of insects than any other sort of animal or plant. On warm sunny days, especially in the spring and early summer, many insects can be seen crawling on flowers, on plants, and on the ground or swimming in the water or flying about in the air. On cooler days and during the winter, insects are much less active. The Tilden Nature Area contains insects from all the major orders of insects found in the world and has many kinds which have never been studied by entomologists.

The insects are the only invertebrates with wings and are easily recognized. Some insects, without wings, can be identified by the three pairs of legs and the feelers or antennae. The spiders belong to a different group of arthropods, the Arachnida. They have eight legs and no antennae. Many kinds, some of them very beautiful, are found in the Tilden Nature Area. Another common type of arthropod, the myriapods - (centipedes and millipedes), can be recognized by their many legs and the presence of antennae. They live under rocks, bark, and in the nests of other animals.

Species Found to be Widespread in the Tilden Nature Area

Insects

Grasshopper
California Camel Cricket
Earwig
Stink Bug
Spittle Bug
Leafhopper
Aphid
California Oak Moth
Skipper
Western Tiger Swallowtail Butterfly
Cabbage Butterfly
Orange Tip Butterfly
Sulphur Butterfly
Monarch Butterfly
West Coast Lady Butterfly
Lorquin's Admiral Butterfly
Copper Butterfly
Blue Butterfly
Ground Beetle
Ladybird Beetle
Cucumber Beetle
Darkling Beetle
Western Yellow Jacket
Mud Dauber
Ants
Bumblebee
Honeybee
Fritillary Butterfly
Mourning Cloak Butterfly
Buckeye Butterfly
Paper Wasp

Spiders
House Spider
Trap Door Spider
Wolf Spider

Myriapods
Centipede
Millipede

Insects Found In or Near Water

Water Strider
Giant Water Bug
Backswimmer
Water Boatman
Mayfly
Damselfly
Dragonfly
Diving Beetle
Whirligig Beetle
Mosquito

Printed Materials for the Teacher

Blough, Glenn O. et al. Elementary School Science and How to Teach It. Centipedes and millipedes, 238. Holt, 1958

*Craig, Gerald S. Science for the Elementary-School Teacher. Ginn, 1958
Insects: pp. 539-570
Spiders: See index
Myriapods: p. 544

*Science Guide for Elementary Schools:
Duncan, Carl D. Insects as Enemies and Benefactors of Man. October, 1937

Duncan, Carl D. Termites. April, 1939

Holt, Vesta. Common Insects. October, 1934

Kalmus, Hans. 101 Simple Experiments with insects. Doubleday, 1960

Pickwell, Gayle. Spiders. October, 1935

Siverly, R. E. Insect Rearing in Schools. Wm. C. Brown Co. 1963

Printed Materials for Children

Insects

*Barker, Will. Winter-sleeping Wildlife (6-7). Harper, 1958

*Bartlett, Ruth. Insect Engineers; the Story of Ants (5-6). Morrow, 1957

Beauchamp, Wilbur L. Science Is Learning (2). Scott, Foresman, 1961
"How do Insects Grow?" pp. 94-95

*Blough, Glenn O. After the Sun Goes Down (3-4). Whittlesey, 1956

*Blough, Glen O. Animals and Their Young (2-3). California State Series, 1959

*Blough, Glenn O. Animals Round the Year (2-3). California State Series, 1959

*Materials available in every elementary school

Insects (cont'd)

*Blough, Glenn O. Animals That Live Together (2-3). California State Series, 1959. Bees: pp. 4-13; Ants: pp. 25-31; Termites: pp. 32-35

*Blough, Glenn O. The Insect Parade (3-4) California State Series, 1959

*Conklin, Gladys. I Like Butterflies (3-4). Holiday, 1960

*Conklin, Gladys. I Like Caterpillars (2-3). Holiday, 1958

Craig, Gerals S. and Hill, K. E. Adventuring in Science (5). Ginn, 1954 "Potato Bugs and Ladybirds," p. 1331 "Grasshoppers Grow Up," pp. 134-135; "Butterflies and Moths Grow Up," pp. 136-139

Darby, Gene. What is a Butterfly (3). Benefic, 1958

Earle, Olive L. Crickets (4-5). Morrow, 1956

*Eckhoudt, Jean P. Van den. A Butterfly is Born (5-6). Sterling, 1960

*Fenton, Carroll Lane and Pallas, D. C. Insects and their World (4-5). Day, 1956

Foster, Virgil E. Close-up of a Honeybee (3-4). Scott, 1960

Frasier, George W. et al. Science Experiments (5). Singer, 1959 "Helpful and Harmful Insects," pp. 289-300; "Animals are Put into Groups," pp. 301-309

*Goudey, Alice E. Here Come the Bees! (3-4). Scribner, 1960

Hogner, Dorothy C. Grasshoppers and Crickets (4-5). Crowell, 1960

*Hutchins, Ross E. Insects; Hunters and Trappers (5-6). Rand, 1957

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. "Insects," pp. 3-31

McClung, Robert M. Green Darner; the Story of a Dragonfly (3). Morrow, 1956

McClung, Robert M. Sphinx; the Story of a Caterpillar (3-4) Morrow, 1949

*McClung, Robert M. Tiger; the Story of a Swallowtail Butterfly (3-4). Morrow, 1953

*Marcher, Marion W. Monarch Butterfly (3-4). Holiday, 1954

Martin, Richard. Butterflies and Moths (5-6). Simon & Schuster, 1958

*Materials available in every elementary school

*Parker, Bertha Morris. Plant and Animal Partnership (5-6). California State Series, 1959

*Parker, Bertha Morris. Insects and their Ways (5-6) California State Series, 1959

*Parker , Bertha Morris. Six-Legged Neighbors (2-3). California State Series, 1959

*Peter, Katherine and Wadham, Robert. California Wonder World (4). California State Series, 1959 (See index)

*Phillips, Mary G. Dragonflies and Damselflies (5-6). Crowell, 1960

*Schneider, Herman and Nina. Science Far and Near (3). California State Series, 1959 "Insects" (in lake or stream), pp. 170-171

*Schneider, Herman and Nina. Science in our World (5). California State Series, 1959. "Insects, " pp. 103-104

*Schneider, Herman and Nina. Science in your Life (4). California State Series, 1959. "Insects that Work Together, " pp. 134-142

*Shackelford, Frederick. Insect Stories (5-6). California State Series, 1942

*Smith, Arthur C. Western Butterflies (5-6). Lane, 1961

*Smith, Frances. First Book of Conservation (4-5). Watts, 1954

Sterling, Dorothy. Caterpillars (4-5). Doubleday, 1961

*Sterling, Dorothy. Creatures of the Night (5-6). Doubleday, 1960

Sterling, Dorothy. Insects and the Homes They Build (5-6). Doubleday, 1954

*Swain, Su Zan. Insects in Their World (6-7). Garden City, 1955

Thurber, Walter A. Exploring Science, Two. Allyn, 1960. "Grasshoppers," pp. 4-18

Thurber, Walter A. Exploring Science, Five. Allyn, 1960. "Insects that Work Together," pp. 4-24; "Life in Quiet Waters," pp. 323-337

*Tibbets, Albert B. First Book of Bees (4). California State Series, 1959

*Williamson, Margaret. The First Book of Bugs (4). Watts, 1949

*Zim, Herbert S. Insects; a Guide to Familiar American Insects (5-6). Golden Press, 1956

Spiders

Craig, Gerals S. and Hill, Katherine E. Adventuring in Science(5)Ginn1954. p. 232

*Materials available in every elementary school

Spiders (Cont'd)

Frasier, George W. et al. Science Experiments (5). Singer, 1959 "Animals are Put into Groups," pp. 301-309

*Hogner, Dorothy. Spiders (3-4). Crowell, 1955

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. "Arachnids," pp. 124-125

*Parker, Bertha. Spiders (4-5). California State Series, 1959

*Peter, Katherine and Wadham, Robert. California Wonder World (4). California State Series, 1959 (See index)

*Schneider, Herman and Nina. Science Far and Near (3). California State Series, 1959 "Spiders Spin," pp. 85-86

*Shuttlesworth, Dorothy. The Story of Spiders (6-7). Garden City, 1959

Myriapods

Thurber, Walter A. Exploring Science, Four. Allyn, 1960
Picture of centipede and millipede, p. 214

Thurber, Walter A. Exploring Science, Six. Allyn, 1960
Picture of centipede and millipede, p. 324

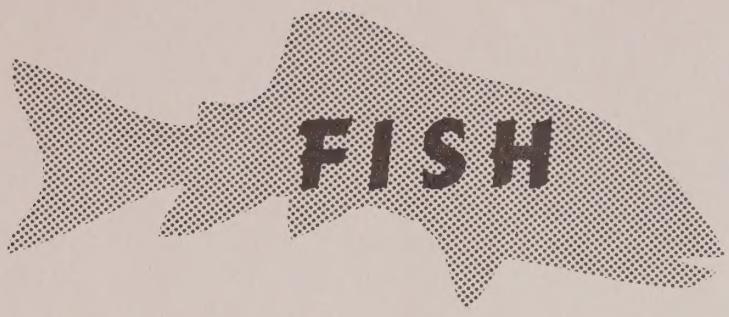
Audio-Visual Materials

Filmstrips:
Animal Life and the Soil, gd. 5 up
Animals Help Us, gd. 3 up
Backyard Insects, Kdgn. up
Butterflies Grow, Kdgn. up
How to Identify Moths and Butterflies, gd. 5 up
Insect Communities, gd. 3 up
Keeping an Aquarium, gd. 5 up
Life Cycle of Monarch Butterfly, gd. 4 up
Life in Ponds, Lakes, and Streams, gd. 5 up
Looking for Animals, Kdgn. up
Small Fresh-water Animals and Insects, gd. 5 up

Motion Pictures:
Battle of the Centuries, 10 minutes, gd. 4 up
Monarch Butterfly, 11 minutes, gd. 4 up
Pond Life, 11 minutes, gd. 4 up
Typical Garden Spiders, 8 minutes, gd. 2 up
Wonders in a Country Stream, 10 minutes, gd. 1 up
Wonders in Your own Backyard, 10 minutes, gd. 1 up
World in a Marsh, 22 minutes, gd. 5 up

2" x 2" Slides:
Story of Honey, gd. 3 up (with script)

*Materials available in every elementary school



There is only one species of fish which is native to the Tilden Nature Area. This is the STICKLEBACK. He can be seen in Jewel Lake and in the pools along Wildcat Creek when the water is clear. He is an extremely interesting fish in that, in his particular species, the male fish builds a very complicated nest and guards the eggs and young with his life. Most fish build little or no nest and if the eggs are guarded, it is usually done by the female.

This little fish has very sharp spines, from which he gets his name. These help to protect him against some of his enemies.

On occasion, people have released other fishes, ranging from goldfish to game species, that they have caught elsewhere, into Jewel Lake. However, they do not usually survive under the lake and creek conditions, which seem suitable only for the stickleback. The introduction of "exotic" or non-native species into the Nature Area is to be discouraged as disastrous results often occur, usually to the detriment of the creatures that nature intended to live there.

Printed Materials for the Teacher

*Science Guide for Elementary Schools:
Reid, Lea. Fresh Water Aquaria. May, 1936

Printed Materials for Children

Beauchamp, Wilbur L. and Challand, Helen J. Science is Exploring (3). Scott, Foresman, 1961/ "How Do Living Things Get Food?" pp. 5-44

Craig, Gerald S. and Hill, K. E. Adventuring in Science (5). Ginn, 1954 "Fish Grow Up," pp. 146-149

Darby, Gene. What is a Fish (2-3). Benefic, 1958

Frasier, George W. et al. Science Experiments (5). Singer, 1959 "Egg-laying Animals," pp. 274-276; "Animals Are Put into Groups," pp. 301-306

Jacobson, Willard J. and Lauby, Cecilia J. ABC Science Series, 5. American, 1961. "Fish," pp. 132-135; "Living Things in Their Environment," pp. 167-212

*Parker, Bertha Morris. Fishes (5-6). California State Series, 1959

*Materials available in every elementary school

Fishes (Cont'd).

*Peter, Katherine and Wadham, Robert. California Wonder World (4). (See index) California State Series, 1959

*Schneider, Herman and Nina. Science Far and Near (3). "Fish," pp. 163-167 California State Series, 1959

*Schneider, Herman and Nina. Science in our World (5). "Fish," p. 102 California State Series, 1959

*Selsam, Millicent. How the Animals Eat (4-5). Scott, 1955

Thurber, Walter A. Exploring Science, Six. Allyn, 1960. "Fish Life," pp. 55-80

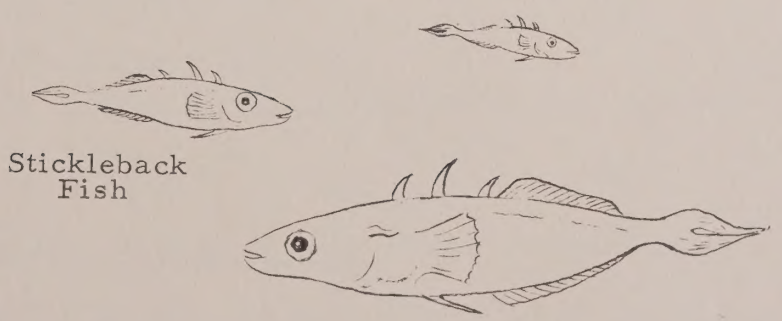
*Wells, Harrington. Fish and Fishing (5-6). California State Series, 1954 "How Fish Live," pp. 33-50

*Zim, Herbert S. Fishes (3-4). Golden Press, 1959

Audio-Visual Materials

Filmstrips:
- Air and Life, gd. 3 up
- Animals Help Us, gd. 3 up
- Fish, Kdgn. up
- Fresh Water Turtles and Fish, gd. 5 up
- Keeping an Aquarium, gd. 5 up
- We Protect Animals, gd. 3 up
- Wildlife Resources, gd. 5 up

Motion Pictures:
- Life in an Aquarium, 10 minutes, gd. 3 up
- Pond Life, 11 minutes, gd. 4 up



Stickleback Fish

* Materials available in every elementary school

Wildcat Creek, Jewel Lake and moist woodland situations in the Tilden Nature Area provide ideal habitat for a number of amphibians. During the breeding seasons and following rain when the weather is not cold are the most active periods for these smooth-skinned creatures.

The introduction of the Bullfrog into the Nature Area has resulted in a rapid disappearance of the native Red-legged frog, because of the Bullfrogs' predatory nature and its ability to compete strongly for the available food and habitat.

Amphibians, particularly in conjunction with reptile study, provide fascinating subject matter for nature study. The possibility of finding live specimens in the field while on an excursion are not great. However, a number of exhibits, including live specimens on display in terrariums in the Nature Lodge, can supplement the program should this be a desired choice of subject matter emphasis.

Species in the Area	When Observed
American Bull Frog (introduced)	All year
Red-legged Frog	A few all year - hundreds in early fall
Pacific Tree Toad	A few all year - Many during wet weather
Northern Slender Salamander	
Pacific Coast Newt	A few all year - Many during wet weather
Tree Salamander	Wet weather

Printed Materials for the Teacher

*Science Guide for Elementary Schools:
Pickard, Edith A. Frogs, Toads, and Salamanders. January, 1935

Printed Materials for Children

*Barker, Will. Winter-sleeping Wildlife (6-7). Harper, 1958

Beauchamp, Wilbur L. Science Is Learning (2). Scott, Foresman, 1961
"How Do Amphibians Grow?" pp. 96-97

*Blough, Glenn O. After the Sun Goes Down (3-4). Whittlesey, 1956

*Blough, Glenn O. Animals Round the Year (2-3). California State Series, 1959

Craig, Gerald S. and Hill, K. E. Adventuring in Science (5). Ginn, 1954
"Salamanders Grow Up," pp. 140-143

Amphibians (Cont'd)

Frasier, George W. et al. Science Experiments (5). Singer, 1959 "Animals are put into Groups," pp. 301-306. "Egg-laying Animals," p. 274

Frasier, George W. et al. Science Problems (6). Singer, 1959 "How Animals Grow and Develop," pp. 211-217

Harris, Louise D. and Norman D. Little Red Newt (4-5). Little, 1958

*Hogner, Dorothy C. Frogs and Polliwogs (4-5). Crowell, 1956

McClung, Robert. Bufo; the Story of a Toad (3-4). Morrow, 1954

*Parker, Bertha Morris. Toads and Frogs (4-5). California State Series, 1959

*Schneider, Herman and Nina. Science Far and Near (3). California State Series, 1959. "Frogs," pp. 168-169

*Schneider, Herman and Nina. Science in our World (5). California State Series, 1959. "Amphibians," pp. 100-101

Schoenknecht, Charles A. Frogs and Toads (3). Follett, 1960

*Sears, Paul M. Tree Frog (3-4). Holiday, 1954

*Stebbins, Robert C. Reptiles and Amphibians of the San Francisco Bay Region (6-7). University of California Press, 1959

Thurber, Walter A. Exploring Science, Three. Allyn, 1960 "Toads and Frogs," pp. 159-174

Zim, Herbert S. Amphibians and Reptiles (5-6). Simon & Schuster, 1953

*Zim, Herbert S. Frogs and Toads (4-6). Morrow, 1950

Audio-Visual Materials

Filmstrips:

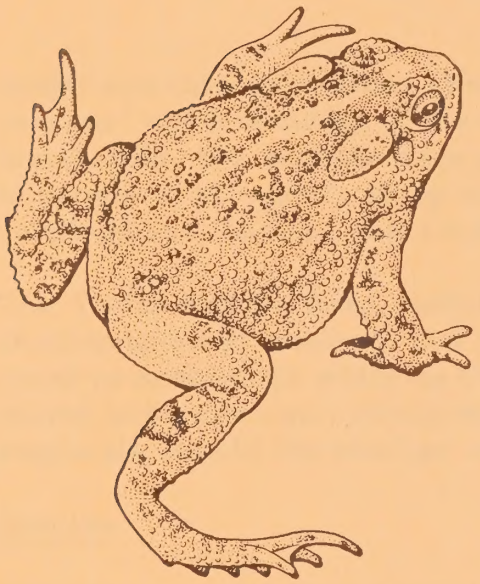
Animals Help Us, gd. 3 up
Frogs, Toads & Turtles and How They Grow (most species shown are non-native), gd. 3 up
Hibernation: Animals, gd. 4 up
Keeping an Aquarium, gd. 5 up
Looking for Animals, Kdgn. up
Toads Grow, Kdgn. up

*Materials available in every elementary school

Amphibians (Cont'd)

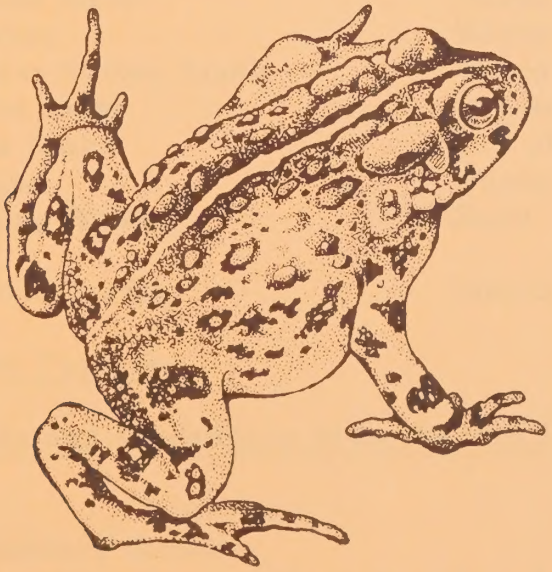
Flat Pictures: Frogs, Toads, Salamanders, Kdgn. up

Motion Pictures: Frog's Life, 8 minutes, gd. 2 up
Pond Life, 11 minutes, gd. 4 up
Wonders in a Country Stream, 10 minutes, gd. 1 up
World in a Marsh, 22 minutes, gd. 5 up

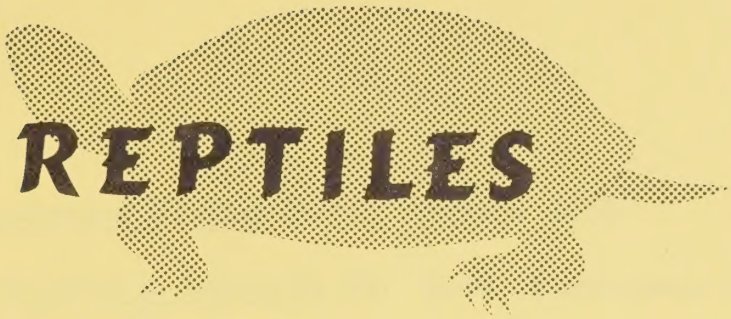


Southwestern Toad

Pacific Treefrog



Western Toad



Myths and misconceptions are the rule rather than the exception where the average persons' understanding of the reptiles is concerned. Be it from fear or simple fascination, the reptiles as a group of animals have always been of great interest to people of all ages. Many interesting facts can be learned through a study of the development, habits, and adaptations of this unique group of animals.

The Tilden Nature Area contains a variety of habitat situations which provides for an abundance of numbers and species. However, because it is often difficult to observe specimens while on the trails, a number of species of reptiles are maintained in terrariums, along with display material, in the Nature Lodge for study emphasis should the teacher so desire.

Species		When Seen
Lizards:	Alligator Lizards	Warm days, wide range
	Western Fence Lizard	Warm days, rocks and logs
	Blue-tailed Skink	Rarely - very secretive
Snakes:	Yellowbellied Racer	Warm days in grass
	Garter Snakes	Warm days on or near water
	Pacific Coast Garter Snake	Warm days, wide range
	Ring-necked Snake	Dry slopes in leaves
	Rubber Boa Snake	Dry slopes in grass
	Gopher Snake	Warm grassy places
	Common King Snake	Rare
Turtles:	Western Pond Turtle	March to November

Printed Materials for the Teacher

Pickwell, Gayle. Reptiles and Amphibians of the Pacific States. Stanford University Press, 1947

*Science Guide for Elementary Schools:
Hadsell, Leo F. Snakes, Lizards, and Turtles. May, 1935

Printed Materials for Children

*Ballard, Lois, True Book of Reptiles (3). Children's press, 1957

*Materials available in every elementary school

Reptiles (cont'd)

*Barker, Will. Winter-sleeping Wildlife (6-7). Harper, 1958

Beauchamp, Wilbur L. Science is Learning (2). Scott, Foresman, 1961 "How do Reptiles Grow?" p. 98

Bronson, Wilfrid S. Turtles (3-4). Harcourt, 1945

Craig, Gerals S. and Hill, K. E. Adventuring in Science (5). Ginn, 1954 "Snakes Grow Up," pp. 144-145

Craig, Gerald S. et al. Experimenting in Science (6). Ginn, 1955 "Animals and Seasonal Change," pp. 77-97

Darby, Gene. What is a Turtle (1). Benefic, 1959

Frasier, George W., et al. Science Experiments (5). Singer, 1959 "Egg-laying Animals," pp. 272-273; "Helpful and Harmful Snakes," pp. 284-288; "Animals are Put into Groups," pp. 301-305

*Hoke, John. First Book of Snakes (4-5) Watts, 1952

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. "Reptiles," pp. 137-139; "Living Things in their Environment," pp. 167-212

McClung, Robert M. Buzztail; the Story of a Rattlesnake (4-5). Morrow, 1958

*Parker, Bertha Morris. Reptiles (5-6). California State Series, 1959

*Peter, Katherine and Wadham, Robert. California Wonder World (4). (See index) California State Series, 1959

*Pope, Clifford. Reptiles Round the World (5-6). Knopf, 1957

*Schneider, Herman and Nina. Science in our World (5). California State Series, 1959. "Reptiles," pp. 98-99

*Stebbins, Robert C. Reptiles and Amphibians of the San Francisco Bay Region (6-7). University of California Press, 1959

Thurber, Walter A. Exploring Science, Four. Allyn, 1960. "Turtles and Other Reptiles," pp. 214-232

*Zim, Herbert S. Snakes (4-6). Morrow, 1949

*Materials available in every elementary school

Reptiles (cont'd)

Audio-Visual Materials

Filmstrips:
- Animals Help Us, gd. 3 up
- Fresh Water Turtles and Fish, gd. 5 up
- Hibernation: Animals, gd. 4 up
- Keeping an Aquarium, gd. 5 up
- Reptiles, gd. 3 up
- Snakes, gd. 3 up
- Snakes, Lizards You Should Know, gd. 5 up
- Wildlife Resources, gd. 5 up

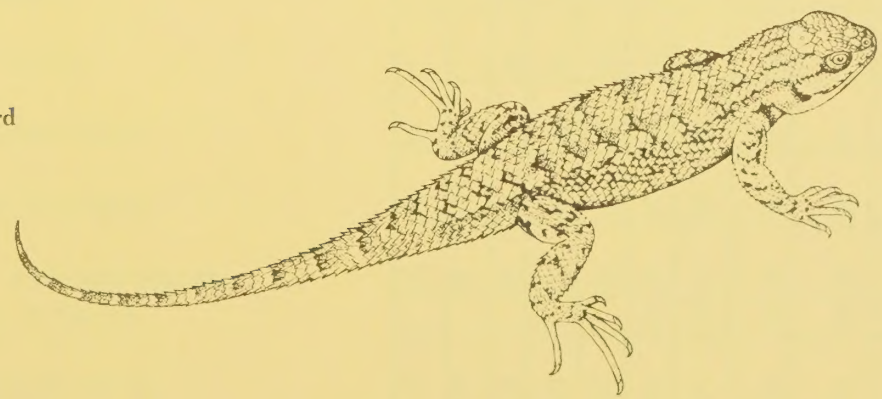
Flat Pictures:
- Snakes, gd. 5 up

Motion Pictures:
- Reptiles, 14 minutes, gd. 5 up
- Snakes Can Be Interesting, 10 minutes, gd. 3 up
- Snapping Turtle, 11 minutes, gd. 3 up
- Wonders in a Country Stream, 10 minutes, gd. 1 up

Oakland Public Museum (Templebar 2-8466)

Mounted Specimens:
- Gopher Snake
- Rattlesnake

Western Skink



Western Fence Lizard

The Tilden Nature Area has, for a long time, been considered to be one of the choice spots in the East Bay Area for the study of birds. The great variety of habitats available, the diversity of ground cover, and the protection afforded them, has provided an opportunity to see and study a wide variety of species as the following list will indicate.

Certainly a void would exist on any nature hike or outdoor experience if we were not provided with the comedy of antics and the beauty of flight, color, and sound provided by our feathered friends. Much can be learned from them, not only of themselves, but of the habitat and even the weather.

Excellent exhibit material and teaching devices have been prepared to augment what can be done in the field to provide a truly comprehensive study of the bird world should a teacher wish to emphasize this subject during her excursion.

Checklist of Species Common in the Tilden Nature Area

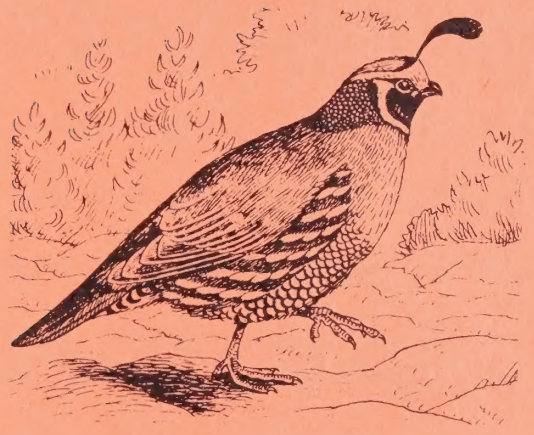
Months When Observed (Beginning with September)

		S	O	N	D	J	F	M	A	M	J	J	A
Surface-feeding Ducks	Mallard	X	X	X	X	X	X	X	X	X	X	X	X
Diving Ducks	Redhead			X	X	X	X	X	X				
	Canvasback			X	X	X	X	X	X				
	Lesser Scaup			X	X	X	X	X	X				
	American Golden Eye			X	X	X	X	X	X				
	Bufflehead			X	X	X	X	X	X				
Ruddy Ducks	Ruddy Duck			X	X	X	X	X	X				
Rails & Coots	American Coot	X	X	X	X	X	X	X	X	X	X	X	X
Vultures	Turkey Vulture	X	X	X	X	X	X	X	X	X	X	X	X
Short-winged Hawks	Sharp-shinned Hawk	X	X	X	X	X	X	X	X	X	X	X	X
	Cooper's Hawk						X	X	X	X	X		
Bread-winged Hawks	Red-tailed Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Falcons	Sparrow Hawk	X	X	X	X	X	X	X	X	X	X	X	X

		Months When Observed (Beginning with September)											
		S	O	N	D	J	F	M	A	M	J	J	A
Quail	California Quail	X	X	X	X	X	X	X	X	X	X	X	X
Pigeons & Doves	Western Mourning Dove	X	X	X					X	X	X	X	X
Owls	Great Horned Owl	X	X	X	X	X	X	X	X	X	X	X	X
Hummingbirds	Anna's Hummingbird	X	X	X	X	X	X	X	X	X	X	X	X
	Allen's Hummingbird						X	X	X	X	X		
	Rufous Hummingbird						X	X	X				
Woodpeckers	Red-shafted Flicker	X	X	X	X	X	X	X	X				
	Yellow-bellied Sapsucker			X	X	X	X	X	X				
	Downy Woodpecker	X	X	X	X	X	X	X	X	X	X	X	X
Flycatchers and Larks	Horned Lark						X	X	X				
	Black Phoebe	X	X	X	X	X	X	X	X	X	X	X	X
	Olive-sided Flycatcher	X							X	X	X	X	X
	Western Flycatcher	X							X	X	X	X	X
Jays & Crows	Steller Jay	X	X	X	X	X	X	X	X	X	X	X	X
	California (Scrub) Jay	X	X	X	X	X	X	X	X	X	X	X	X
Titmice	Chestnut-backed Chickadee	X	X	X	X	X	X	X	X	X	X	X	X
	Black-capped Chickadee	X	X	X	X	X	X	X	X	X	X	X	X
	Plain Titmouse	X	X	X	X	X	X	X	X	X	X	X	X
	Bush-tit	X	X	X	X	X	X	X	X	X	X	X	X
Wren-tits	Wren-tit	X	X	X	X	X	X	X	X	X	X	X	X
Wrens	Bewick Wren	X	X	X	X	X	X	X	X	X	X	X	X
Thrushes	Western Robin	X	X	X	X	X	X	X	X	X	X	X	X
	Varied Thrush	X	X	X	X	X	X	X					
	Hermit Thrush		X	X	X	X	X	X	X	X			
	Swainson Thrush								X	X	X	X	X
	Russet-backed Thrush			X	X	X	X	X	X	X	X		
Thrashers	California Thrasher				X	X	X	X	X				
Kinglets	Ruby-crowned Kinglet			X	X	X	X	X	X				
Waxwings	Cedar Waxwing			X	X	X	X						
Vireos	Hutton's Vireo	X	X	X	X	X	X	X	X	X	X	X	X
Wood Warblers	Orange-crowned Warbler								X	X	X		
	Audubon's Warbler			X	X	X	X	X	X				
	Townsend Warbler			X	X	X	X	X					

Months When Observed (Beginning with September)

		S	O	N	D	J	F	M	A	M	J	J	A
Meadowlarks and Blackbirds	Red-winged Blackbird	X						X	X	X	X	X	X
	Western Meadowlark	X	X	X	X	X	X	X	X	X	X	X	X
	Bullock's Oriole									X	X		
	Brewer Blackbird	X	X	X	X	X	X	X	X	X	X	X	X
Grosbeaks, Finches and Sparrows	Black-headed Grosbeak								X	X	X		
	California Purple Finch	X	X	X	X	X	X	X	X	X	X	X	X
	House Finch	X	X	X	X	X	X	X	X	X	X	X	X
	Pine Siskin	X	X	X	X	X	X	X	X	X	X	X	X
	Common Goldfinch	X	X	X	X	X	X	X	X	X	X	X	X
	Rufous-sided Towhee	X	X	X	X	X	X	X	X	X	X	X	X
	Brown Towhee	X	X	X	X	X	X	X	X	X	X	X	X
	Oregon Junco	X	X	X	X	X	X	X	X	X	X	X	X
	Song Sparrow	X	X	X	X	X	X	X	X	X	X	X	X
	Fox Sparrow			X	X	X	X	X					
	Golden-crowned Sparrow			X	X	X	X	X					
	White-crowned Sparrow			X	X	X	X	X					

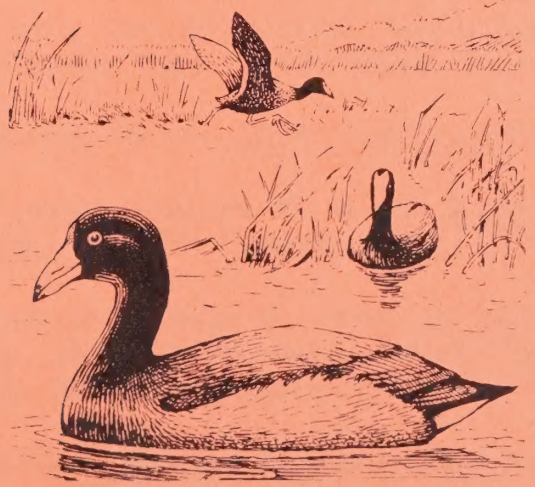


California Quail

(IN THE BRUSH)

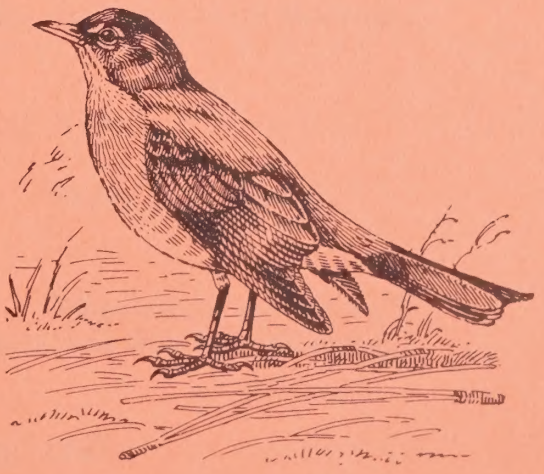
Red-tailed Hawk

(IN THE AIR)



Coot

(ON THE WATER)



Robin

(ON THE LAWN)

Birds (Cont'd.)

Printed Materials for the Teacher

*Craig, Gerald S. Science for the Elementary-School Teacher. Ginn, 1958 "Animals are Home-Builders," pp. 580-586; "Animals are Adapted to Survive Seasoned Changes," pp. 611-626

Hoffman, Ralph. Birds of the Pacific States. Houghton, 1927

Peterson, Roger Tory. Field Guide to Western Birds. Houghton, 1961

*Science Guide for Elementary Schools:
Holt, Vesta. Seeds and their Dispersal, pp. 27-31. August, 1940
Pickwell, Gayle. Birds. April, 1935

Printed Materials for Children

Beauchamp, Wilbur L. and Challand, Helen J. Science is Exploring (3). Scott, 1961. "How do Living Things Get Food?" pp. 5-44

Beauchamp, Wilbur L. Science is Learning (2) Scott, Foresman, 1961 "How do Birds Grow?" pp. 84-85; "What do Birds Need to Grow?" pp. 86-87

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*Earle, Olive. Birds and Their Nests (5-6). Morrow, 1952

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*Hyde, Margaret O. Animal Clocks and Compasses (5-6). Whittlesey, 1960

Birds (Cont'd.)

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. "Living Things in their Environment," pp. 167-212; "Birds," pp. 140-146

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*McClung, Robert. Ruby Throat; the Story of a Humming Bird (4-5). Morrow, 1950

Mason, George. Animals Sounds (5-6). Morrow, 1948

*Parker, Bertha Morris. Animal Travels (6). California State Series, 1959

*Parker, Bertha Morris. Birds (4-5). California State Series, 1959

*Peter, Katherine and Wadham, Robert. California Wonder World (4). (See index) California State Series, 1959

*Ripper, Charles L. Hawks (4-5). Morrow, 1956

*Schneider, Herman and Nina. Science Far and Near (3). California State Series, 1959. "Water Birds," pp. 180-184

*Schneider, Herman and Nina. Science in our World (5). California State Series, 1959. "Birds," pp. 94-97

*Schneider, Herman and Nina. Science in Your Life (4). California State Series, 1959. "How Birds Fly," pp. 71-74

Sears, Paul M. Downy Woodpecker (4). Holiday, 1953

*Selsam, Millicent. How the Animals Eat (4-5). Scott, 1955

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*Urell, Catherine et al. Big City Book of Conservation (5-6). California State Series, 1959. "Spring in the Park," pp. 73-82

*Williamson, Margaret. First Book of Birds (4). California State Series, 1959

*Materials available in every elementary school

Birds (Cont'd)

*Wong, Herbert H. Ducks, Geese and Swans (5-6). Lane, 1960

*Zim, Herbert S. Birds (5-6). Simon and Schuster, 1949

*Zim, Herbert S. Owls (4-5). Morrow, 1950

Audio-Visual Materials

Filmstrips:
- Animal Life and the Soil, gd. 5 up
- Animals Help Us (animals help man by giving songs, eating pests, etc.), gd. 3 up
- Birds of Lake and Marsh, gd. 4 up
- Feathered Friends of the Lakeshore, gd. 4 up
- How to Recognize Birds (some species not native), gd. 5 up
- Looking for Animals, Kdgn. up
- Mr. & Mrs. Robin and Their Springtime Family, Kdgn. up
- Nests, gd. 3-6
- Our Very Friendly Birds - Their Homes & Habits, gd. 4 up
- Owls: Their Homes & Habits, gd. 4 up
- Visit to Gull Island, gd. 4 up
- We Protect Animals, gd. 3 up
- Wildlife Resources, gd. 5 up

Flat Pictures:
- American Game Birds (many not seen at Tilden)

Motion Pictures:
- Bird Homes, 11 minutes, gd. 3 up
- Birds in your Backyard, 11 minutes, Kdgn. up
- Hummingbird Homelife, 10 minutes, Kdgn. up
- Robin Redbreast, 11 minutes, gd. 3 up
- World in a Marsh, 22 minutes, gd. 5 up

2" x 2" Slides:
- American Game Birds, gd. 3 up
- Birds of California (draw ings of birds and plants; many found in Tilden; with script), gd. 4 up
- Birds of Fields & Frairies (to be used with "bird call" record #484)
- Birds of Western North America (may bc used with "bird call" record #486)
- Lake Merritt Waterfowl (with script) Kdgn. up
- North American Game Birds (may be used with "bird call" record #485)

Oakland Public Museum (TEmplebar 2-8466)

Mounted Specimens: California Birds

*Materials available in every elementary school

Mammals comprise the group of creatures that most children associate with the word "animal". Many are to be found in the Nature Area but few are seen. This is due mostly to the fact that many of our species are nocturnal in their habits. Also, the vast amount of vegatational cover allows the timid diurnal animals to remain safely hidden from view, especially from large groups which can easily be seen and heard coming their way.

All of the species listed below play a part in the total ecological balance and relationships that exist in the Nature Area. It is believed that the major predatory factor which exists in the local food chain and balance of nature, now rests with the feral house cat rather than with the native species such as the fox and the bobcat.

Species	Seen in day time
Virginia Opossum (introduced)	Seldom
Shrew	Seldom
Mole	Seldom
Bat	Never
Raccoon	Seldom
Striped Skunk	Seldom
Spotted Skunk	Never
Long-tailed Weasel	Never
Coyote	Seldom
Grey Fox	Seldom
Bobcat	Seldom
Cat (Domestic - introduced)	Often
Cougar	Never
Fox Squirrel (introduced)	Often
Deer Mouse	Seldom
Meadow Mouse	Seldom
House Mouse	Seldom
Pocket Gopher	Seldom
Wood Rat	Seldom
Cottontail Rabbit	Seldom
Brush Rabbit	Often
Jack Rabbit	Often
Black-tailed Deer	Often

Mammals (cont'd)

Printed Materials for the Teacher

*Craig, Gerals S. Science for the Elementary-School Teacher. Ginn, 1958 "Plants and Animals Live in Communities," pp. 487-520; "Living Things Compete," pp. 521-538

*Science Guide for Elementary Schools:
Culbertson, A. E. Large Wild Mammals of California. October, 1938
Hadsall, Leo F. How Animals Protect Themselves. November, 1937
Ingles, Lloyd. Small Wild Mammals of California. August, 1936

Snedigar, Robert. Our Small Native Animals. Random House, 1939

Printed Materials for Children

Allen, Gertrude E. Everyday Animals (3-4). (Rabbit, chipmunk, white-footed mouse, skunk, porcupine, squirrel) Houghton, 1961

*Barker, Will. Winter-sleeping Wildlife (6-7). Harper, 1958

Beauchamp. Wilbur L. and Challand, Helen J. Science Is Exploring (3). "How Do Living Things Get Food?" pp. 5-44. Scott, Foresman, 1961

*Berry, William D. and Elizabeth. Mammals of the San Francisco Bay Region (6-7). University of California Press, 1959

*Blough, Glenn O. After the Sun Goes Down (3-4). Whittlesey, 1956

*Blough, Glenn O. Animals Round the Year (2-3). California State Series, 1959

Bronson, Wilfrid. Coyotes (4-5). Harcourt, 1946

Bronson, Wilfrid S. Freedom and Plenty (5-6). Harcourt, 1953

Craig, Gerald S. et al. Experimenting in Science (6). Ginn, 1955. "Animals and Seasonal Change," pp. 77-97

Craig, Gerald S. and Lembach, M. W. Science Everywhere (3). Ginn, 1954 "How Animals are Different," pp. 5-29; "How Animals get Food," pp. 31-37; "How Animals Escape from Enemies," pp. 39-45

Earle, Olive L. Mice at Home and Afield (4-5). Morrow, 1957

Frasier, George W. et al. Science Experiments (5). Singer, 1959. "How Do Mammals Reproduce?" p. 276; "Animals are Put into Groups," pp. 301-303

* Materials available in every elementary school

Mammals (Cont'd).

Gall, Alice and Crew, Fleming. Ringtail (raccoon) (3-5). Oxford, 1933

George, John and Jean. Masked Prowler; the Story of a Raccoon (6-7). Dutton, 1950

Goudey, Alice E. Here Come the Raccoons! (4-5). Scribner, 1959

Graham, Edward H. Wildlife for America (5). Oxford, 1949

*Hyde, Margaret O. Animal Clocks and Compasses (5-6). Whittlesey, 1960

Lavine, Sigmund A. Strange Travelers (5-6). Little, 1960

Lathrop, Dorothy P. Let Them Live (5). Macmillan, 1951

Mason, George. Animal Homes (5-6). Morrow, 1947

Mason, George. Animal Sounds (5-6). Morrow, 1948

Mason, George. Animal Weapons (5-9). Morrow, 1949

*Peter, Katherine and Wadham, Robert. California Wonder World (4). California State Series, 1959. (See index)

*Ripper, Charles. Bats (5-6). Morrow, 1954

*Ripper, Charles. L. Moles and Shrews (5-6). Morrow, 1957

Ripper, Charles L. The Weasel Family (5-6). Morrow, 1959

*Schneider, Herman and Nina. Science for Here and Now (2). California State Series, 1959. "Animals in Winter," pp. 101-106

*Schneider, Herman and Nina. Science in our World (5). California State Series, 1959. "Mammals," pp. 91-93

*Schwartz, Elizabeth and Charles. Cottontail Rabbit (3-4). Holiday, 1957

*Selsam, Millicent. How the Animals Eat (4-5). Scott, 1955

*Smith, Frances. First Book of Conservation (4-5). Watts, 1954

Thurber, Walter A. Exploring Science, Five. Allyn, 1960. "Animal Tracks and Signs," pp. 113-136

*Zim, Herbert S. Rabbits (3-4). Morrow, 1948

*Materials available in every elementary school

Mammals (Cont'd).

Audio-Visual Materials

Filmstrips:
- Animals Help Us, gd. 3 up
- Common Animals of the Woods, Kdgn. up
- Hibernation: Animals, gd. 4 up
- Mammals of North America, Kdgn. up
- Mrs. Cottontail and Her Springtime Family, Kdgn. up
- Plants Help Us, gd. 3 up
- Rabbits, Kdgn. up
- Soil and Its Uses (how soil is helped by roots and burrowing animals, etc.), gd. 3 up
- We protect Animals, gd. 3 up
- Wildlife Resources, gd. 5 up

Flat Pictures: Natural Resources - Wildlife (California), gd. 4 up

Motion Pictures:
- Baby Animals, 10 minutes, gd. 1 up
- Common Animals of the Woods, 11 minutes, gd. 1 up
- How Nature Protects her Animals, 11 minutes, gd. 6 up
- Three Little Bruins in the Woods, 10 minutes, gd. 1 up

Oakland Public Museum (Templebar 2-8466)

Mounted Specimens:
- Bat
- Gopher
- Raccoon

Western Spotted Skunk

Opossum

Mammals (Cont'd).

Audio-Visual Materials

Filmstrips:
- Animals Help Us, gd. 3 up
- Common Animals of the Woods, Kdgn. up
- Hibernation: Animals, gd. 4 up
- Mammals of North America, Kdgn. up
- Mrs. Cottontail and Her Springtime Family, Kdgn. up
- Plants Help Us, gd. 3 up
- Rabbits, Kdgn. up
- Soil and Its Uses (how soil is helped by roots and burrowing animals, etc.), gd. 3 up
- We protect Animals, gd. 3 up
- Wildlife Resources, gd. 5 up

Flat Pictures:
- Natural Resources - Wildlife (California), gd. 4 up

Motion Pictures:
- Baby Animals, 10 minutes, gd. 1 up
- Common Animals of the Woods, 11 minutes, gd. 1 up
- How Nature Protects her Animals, 11 minutes, gd. 6 up
- Three Little Bruins in the Woods, 10 minutes, gd. 1 up

Oakland Public Museum (Templebar 2-8466)

Mounted Specimens:
- Bat
- Gopher
- Raccoon

Western Spotted Skunk

Opossum

SPORE-BEARING PLANTS

Within the Nature Area are many species of our local spore bearing plants. These primitive plants do not reproduce by seed as the flowering plants do, but by tiny, dustlike spores. Some of these plants are the only living remnants of plant types that flourished in the swamps of the coal forming period of geological history — before man entered upon the scene.

Some are capable of manufacturing their own food, as do the ferns and the scouring rushes. Others are parasitic plants that depend upon the green plants to form their food for them. The saprophitic forms are able to decompose dead plant and animal material as a means of obtaining the nutrition necessary for their growth.

These surviving primitive plant types play an important role in nature's complex food chain -- through their ability to break down dead organic material into nutritive elements that can be utilized by the flowering plant types.

Here, then, can be seen plant succession - the wonderful interdependence of nature with seemingly unimportant plants living and dying to create the conditions necessary for other types of plants to flourish.

Ferns

Species	When Green
Gold Fern	All year
Bracken Fern	April to October
Sword Fern	All year
Wood Fern	All year
Lady Fern	April to November
Woodwardia Fern	All year

Rushes

Horsetail Rush	April to November
Scouring Rush	All year
Knitting Needle Rush	All year

Mushrooms

Several species may be seen during the rainy season.

Spore Bearing Plants

Printed Materials for the Teacher

*Craig, Gerald S. Science for the Elementary-School Teacher. Ginn, 1958. See index.

*Science Guide for Elementary Schools:
Howe, J. Wendall. Ferns, Mosses, Lichens and Related Plants. November, 1936
Rhodes, Robert D. Mushrooms and Other Fungi. January, 1936

Printed Materials for Children

Ferns

Craig, Gerald S. and Hurley, B. D. Discovering with Science (4). Ginn, 1954 "Growing Plants from Spores," pp. 140-144

Frasier, George W. et al. Science Experiments (5). Singer, 1959. p. 221

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. Ferns, pp. 70-71

Mushrooms

Craig, Gerald S. and Hill, Katherine E. Adventuring in Science (5). Ginn, 1954. "Molds and Mushrooms," pp. 12-13

Craig, Gerald S. et al. Experimenting in Science (6). Ginn, 1954. "Plants and Light Energy," p. 63

Frasier, George W. et al. Science Problems (6). Singer, 1959. Mushrooms, pp. 83-86

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. "Fungi," pp. 59, 66-68

*Parker, Bertha M. Dependent Plants (6). California State Series, 1959

*Peter, Katherine and Wadham, Robert. California Wonder World (4). California State Series, 1959. (See index.)

*Schneider, Herman and Nina. Science in Our World (5). California State Series, 1959. "Plants That Do Not Make Seeds," pp. 112-113; "Plants That Are Not Green," p. 117

Thurber, Walter A. Exploring Science, Six. Allyn, 1960. "Plants That Are Not Green," pp. 4-15

Audio-Visual Materials

Filmstrips: Ways of Starting New Plants, gd. 5 up

2" x 2" Slides: Trees: Foothill Woodland Plant Community (with script), gd. 4 up

FLOWERS

Some flowers can be seen at practically any time of the year, but the spring and summer months provide the greatest viewing opportunity. Some, when seen on your front lawn would be classified as "weeds," but here in the Nature Area where they provide food, shelter, and nest building materials, as well as beauty, they are all welcome.

They vary from the tiny brown, scalelike flowers of the sedges and grasses, to the gaudy, multi-colored Indian Paintbrush; from the tiny bloom of the Scarlet Pimpernel to the large distinctive, three-petaled Trillium. In addition to their beauty and value to wildlife as a source of food, flowers provide the signposts to many natural remedies. Indians and early settlers used Yarrow to stop bleeding and Cow Parsnip root as a toothache remedy.

Between the flowers and insects there exists a bond of necessity. Without the bees, moths and butterflies, pollen would not be transferred from the stamen of one flower to the pistil of another. Red Clover cannot be grown successfully unless bumblebees are present in sufficient numbers to pollinate the blossoms. Many of these stories and relationships will find their way into the discussions, since it would be difficult to ignore such beauty along the trail.

Checklist of Species Common in the Nature Area

Months in bloom (Beginning with September)

Species	S	O	N	D	J	F	M	A	M	J	J	A
Aster	X	X									X	X
Blue-eyed Grass							X	X	X	X		
Brodiaea							X	X	X	X		
Bush Monkey Flower	X						X	X	X	X	X	X
Buttercup							X	X	X			
California Poppy							X	X	X	X	X	X
Checker Bloom						X	X	X	X	X	X	
Cow Parsnip								X	X	X	X	
Daisy								X	X	X	X	X
Dandelions	X	X	X			X	X	X	X	X	X	X
Dock								X	X	X		
Fairy Bell							X	X	X			

	S	O	N	D	J	F	M	A	M	J	J	A
Filaree								X	X	X		
Goldenrod	X	X										X
Golden mimulus										X	X	X
Indian Paint Brush	X							X	X	X	X	X
Wood Iris								X	X	X	X	
Lupine	X						X	X	X	X	X	X
Mule's Ear						X	X	X	X	X		
Mustard	X					X	X	X	X	X	X	X
Pearly Everlasting										X	X	X
Poison Hemlock									X	X	X	X
Salsify									X	X	X	X
Scarlet Pimpernel	X									X	X	X
Skunk Weed	X										X	X
Star Flower									X	X		
Tar Weed	X	X								X	X	X
Thistles	X							X	X	X	X	X
Trillium						X	X	X				
Vetch								X	X	X	X	
Western Sunflower								X	X			
Yarrow						X	X	X	X	X		

Printed Materials for the Teacher

*Clements, Edith. Flowers of Coast and Sierra. H. W. Wilson, 1928

*Science Guide for Elementary Schools:
Duncan, Carl. Wild Flower Roads to Learning. March, 1936

Shannon, Terry. Wonderland of Plants. A Whitman & Co. 1960

Swain, SuZan. Plants of Woodland and Wayside. Doubleday, 1958

Printed Materials for Children

Frasier, George W. et al. Science Experiments (5). Singer, 1959 (cont'd)

"How Plants Grow," pp. 194-201; "The Work of Leaves," pp. 202-211; "The Work of Flowers," pp. 212-217; "Plants have Characteristics that Help Them Survive," pp. 218-224

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 6. American, 1961. "Flowering Plants," pp. 32-56

*Parker, Bertha Morris. Flowers, Fruits, Seeds (6). California State Series, 1959

*Schneider, Herman and Nina. Science in Our World (5). California State Series, 1959. "Plants that make Seeds," pp. 107-111

*Schneider, Herman and Nina. Science in Your Life (4). California State Series, 1959. "Plants and Seeds," pp. 118-133

*Selsam, Millicent. Play with Plants (4). Morrow, 1949

*Selsam, Millicent. Play with Seeds (4-5). Morrow, 1957

*Selsam, Millicent. Seeds and More Seeds (2). Harper, 1959

Thurber, Walter A. Exploring Science, Three. Allyn, 1960. "Traveling Seeds," pp. 19-32

Thurber, Walter A. Exploring Science, Five. Allyn, 1960. "Flowers and Their Work," pp. 305-322

*Webber, Irma. Bits That Grow Big (4). Scott, 1949

*Webber, Irma. Travelers All (3-4). Scott, 1944

Audio-Visual Materials

Filmstrips:	Animals Help Us (bees pollinate flowers, earthworms build soil, etc.) gd. 3 up Let's Learn About Seeds, Kdgn. up Parks of a Flowering Plant, gd. 3 up Ways of Starting New Plants, gd. 5 up
Motion Pictures:	California Wildflowers, 10 minutes, gd. 4 up Wildflowers of the West, 30 minutes, gd. 4 up Learning About Flowers, 11 minutes, gd. 1 up Wonders of Plant Growth, 10 minutes, gd. 2 up
2" x 2" Slides:	Trees: Foothill Woodland Plant Community (with script), gd. 4 up Wildflowers: Valley Glassland Plant Community (with script), gd. 4 up

*Materials available in every elementary school

PLANTS OF THE CHAPARRAL

The shrubs of the area, often referred to as "chaparral," provide much in the way of protective cover and food for the animals living here. Even poison oak figures in the diets of forty species of birds, and the deer and rodents eat the berries and leaves with no ill effects.

Many of the shrubs were important as food for the Indians and early settlers. Rose hips contain large amounts of vitamins A and C. These and many other berries and fruits of a number of shrubs and vines were eaten raw or roasted.

The Pacific Wax Myrtle provided the early settlers with waxy berries which were rendered down to make wax for candles. Creek Dogwood is said to have been used as a cure for dog mange.

In addition to their usefulness to man and wildlife directly, many of these shrubs such as the Coyote Bush and Poison Oak are extremely important in the prevention of erosion on our hillsides. Evidences of erosion are common where man has removed such chaparral vegetation from hillside grazing land.

Thus, not only do these plentiful plants give us a carpet of varying colors, they also provide both man and animal with the materials and conditions which are needed for survival.

Major Species in the Nature Area

Shrubs

Australian Salt Bush (Introduced)
Bush Monkey Flower
California Sage
California Wild Rose
Coffee Berry
Coyote Bush
Ceanothus (Wild Lilac)
Cream Bush
Creek Dogwood
Flowering Currant
Gooseberry
Hazel Nut
Ninebark
Oso Berry
Pacific Wax myrtle
Poison Oak
Scotch Broom (introduced)
Canary Broom (introduced)
Silver (bush) Lupine
Snowberry
Thimbleberry
Toyon
Western Leather Wood
Elderberry

Vines

Blackberry
Blue Witch
California Honeysuckle
Giant Vetch
Twin berry
Wild Cucumber

Understory Plants

Bed Straw
Groundsel Weed
Mints
Stinging Nettle
Indian Soap Plant
English Plantain (introduced)

Printed Materials for the Teacher

*Science Guide for Elementary Schools:
Holt, Vesta. Chaparral. August, 1937

Printed Materials for Children

Frasier, George W. et al. Science Experiments (5). Singer, 1959. "The World of Plants," pp. 193-224

Marcy, Clarence A. Padres' Garden (4-5). Wagner, 1937

*Parker, Bertha Morris. Seeds and Seed Travels (4-5). California State Series, 1959

Audio-Visual Materials

Filmstrips: Ways of Starting New Plants, gd. 5 up

Motion Pictures:

2" x 2" Slides: Wildflowers: Chaparral Plant Community (with script), gd. 4 up
Trees: Foothill Woodland Plant Community (with script), gd. 4 up

Toyon

Indian Soap Plant

*Materials available in every elementary school

Trees are the giants of the plant kingdom. Whole churches have been built from the lumber obtained from a single Redwood tree. Trees are the largest living things on the face of the earth today and are also the oldest. The oldest known trees are the Bristlecone Pines of California. One is known to be over 4,600 years old.

In numbers, the native trees predominate in the Nature Area. However, the species of introduced and native trees represented are almost equally divided. All the species of Eucalyptus present in this country were originally introduced from Australia. They have now become so widespread that many people accept them as always having been here.

Trees provide vital shade for the shade loving plants which grow beneath them, food for the animals which inhabit the area, vantage points and nesting sites for birds and tree dwelling mammals, and protective cover in which smaller animals can seek refuge from those that prey upon them.

The California Indians and early settlers depended upon the trees of this area for food, building materials, and medicinal remedies. Today these uses are largely a thing of the past, but trees still provide a welcome contrast to the golden, sun browned summer hillsides.

Native Species	Introduced Species
Blue Elderberry	Black Acacia
Box Elder	Black Cottonwood
California Buckeye	Black Locust
California Bay-Laurel	Douglas Fir
Coast Live Oak	Blue Gum Eucalyptus
Madrone	Red Gum Eucalyptus
Bigleaf Maple	Monterey Pine
Red Alder	Ponderosa Pine
Yellow Willow	Sierra Redwood
	Coast Redwood
	Dawn Redwood

Printed Materials for the Teacher

*Craig, Gerald S. Science for the Elementary-School Teacher. Ginn, 1958 "Plants and Animals Live in Communities," pp. 487-520; "Plants Become Adjusted to Seasonal Changes," pp. 595-610

*Science Guide for Elementary Schools:
Howe, J. Wendall. Trees. March, 1935
Peterson, P. Victor. Native and Introduced Cone-Bearing Trees. April-May, 1937
Reid, Lea. Common Broad-Leafed Trees. May, 1939

Trees (Cont'd.)

Printed Materials for Children

Bulla, Clyde Robert. A Tree is a Plant (2-3). Crowell, 1960

*Cormack, M. B. First Book of Trees (5). California State Series, 1959

Corwin, Mae J. Pioneers' Pathway (5-6). Wagner, 1932

Craig, Gerald S and Hill, K. E. Adventuring in Science (5). Ginn, 1954
"Plants Are Protected," pp. 5-23

Craig, Gerald S. et al. Experimenting in Science (6). Ginn, 1955
"Using Forests Wisely," pp. 180-187

Darby, Gene. What Is a Tree (3). Benefic, 1957

Evans, Eva Knox. Adventure Book of Forest Wonders (4-5). Capitol, 1960

Frasier, George W. et al. Science Discoveries (4). "The Life of a Tree," pp. 202-210. Singer, 1959

Frasier, George W. et al. Science Experiments (5). "The World of Plants," pp. 193-224. Singer, 1959

Frasier, George W. et al. Science Problems (6). Singer, 1959
"Trees Are Plants," pp. 173-184

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 5. American, 1961. "Plant Life," pp. 49-96

Jacobson, Willard J. and Lauby, Cecilia J. A B C Science Series, 6. American, 1961. "Flowering Plants," pp. 32-56

*Lauber, Patricia. Our Friend the Forest (4-5). Doubleday, 1959

Marcy, Clarence A. Indians' Garden (3-4). Wagner, 1937. "Acorns and Oak Leaves," pp. 18-30; "Squirrels' Pantry," pp. 32-44

*Metcalf, Woodbridge. Native Trees of the San Francisco Bay Area (6-7). University of California Press, 1959

*Parker, Bertha Morris. Trees (5-6). California State Series, 1959

*Peter, Katherine and Wadham, Robert. California Wonder World (4). California State Series, 1959. (See Index.)

*Materials available in every elementary school

Trees (Cont'd.)

*Richards, Irmagarde. California Yesterdays (4). California State Series, 1957 "Food for the First Californians," pp. 12-19

Selsam, Millicent. Play With Trees (4-5). Morrow, 1950

*Selsam, Millicent. See Through the Forest (4-5). Harper, 1956

*Smith, Frances. First Book of Conservation (4-5). Watts, 1954

Thurber, Walter A. Exploring Science, Two. Allyn, 1960. "Buds," pp. 103-116

Thurber, Walter A. Exploring Science, Six. Allyn, 1960. "Trees," pp. 273-294

*Urell, Catherine, et al. Big City Book of Conservation (5-6). California State Series, 1959. "Saving Our Trees," pp. 30-38

*Weaver, Harriett E. There Stand the Giants; the Story of the Redwood Trees (4-5). Lane, 1960

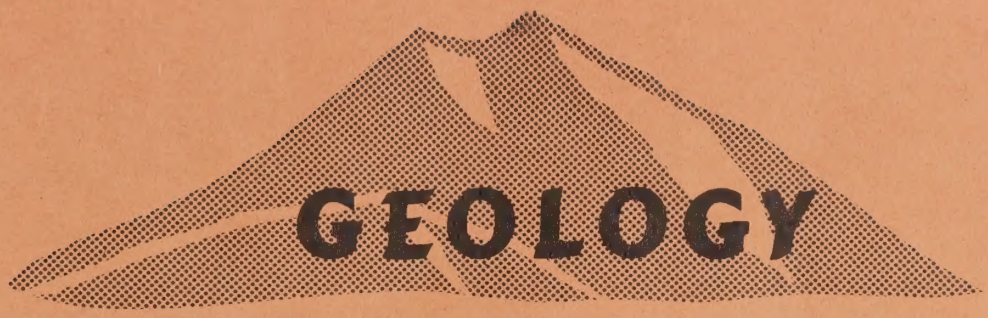
Webber, Irma. Thanks to Trees (3-4). Scott, 1952

Audio-Visual Materials

Filmstrips:	Conservation of Redwood Region Forests, gd. 4 up Forest Resources, gd. 5 up Ways of Starting New Plants, gd. 5 up
Motion Pictures:	Forever Living Forest, 27 minutes, gd. 4 up Sempervirens, 30 minutes, gd. 4 up
2" x 2" Slides:	Trees: Foothill Woodland Plant Community (with script), gd. 4 up California Coast Trees (with script), gd. 4 up

Coast Redwood

California Bay Laurel



The most permanent thing in Nature is change. The surface of the earth is changing this very minute, just as it has been changing for millions of years. Mountains, valleys, plains, and shorelines are constantly being broken down and built up by the forces of nature. Earthquakes and volcanoes are our "mountain makers" -- forcing tons of rock and lava through the earth's crust. Wind and rain, heat, cold, snow and ice, wear away the rock face of the earth. Glaciers, rivers, and streams cut our valleys.

Rock is the raw material of soil itself, upon which man depends. The earth is a great storehouse from which he takes the things he needs. He quarries sand, gravel, limestone, granite, and marble to build his cities and carve his statues. He mines tin, copper, iron ore, for industry. He taps the earth for oil, gas, and coal, the "fossil fuels" formed from the remains of prehistoric animals and plants.

The varied topography, an old quarry, and the presence of the Wildcat Earthquake Fault in the Nature Area provide all the ingredients for a rewarding exploration into a study of the earth's surface.

Printed Materials for the Teacher

*Craig, Gerald S. Science for the Elementary-School Teacher. Ginn, 1958. "The Changing Surface of the Earth," pp. 265-310

* Science Guide for Elementary Schools:

Buss, Fred E. Land Forms. February, 1937
Buss, Fred E. Streams and Their Valleys. February, 1939
Graves, George W. Soil, Its Use and Conservation. September, 1937
Morse, Stanley W. Water, Its Conservation and Use. March, 1937

Printed Materials for Children

Beauchamp, Wilbur L. and Challand, Helen J. Science is Exploring (3). Scott, Foresman, 1961. "What Makes Up the Surface of the Earth?" pp. 85-104

*Cormack, M. B. First Book of Stones (4). California State Series, 1959

Craig, Gerald S. and Hill, K. E. Adventuring in Science (5). Ginn, 1954. "Wind and Water Change the Earth," pp. 181-201

Craig, Gerald S. and Lembach, M. W. Science Everywhere (3). Ginn, 1954. "The Earth You Live On," pp. 99-115

Frasier, George W. et al. Science Problems (6). Singer, 1959. "The Surface of the Earth Changes," pp. 185-209

*Materials available in every elementary school

Jacobson, Willard, J. and Lauby, Cecilia J. A B C Science Series, 5. American , 1961. "The Changing Surface of the Earth," pp. 1-48

*Schneider, Herman and Nina. Science Far and Near (3). California State Series, 1959. "The Earth's Cover," pp.2-22; "Rock and Clay," pp.39-57

*Schneider , Herman and Nina. Science for Today and Tomorrow (6). California State Series, 1959. "The Changing Earth," pp. 213-246

*Schneider, Herman and Nina. Science in our World (5). California State Series, 1959. "Water and Conservation," pp. 137-159

*Urell, Catherine, et al. Big City Book of Conservation (5-6). California State Series, 1959. "Saving Soil and Water," pp. 42-51

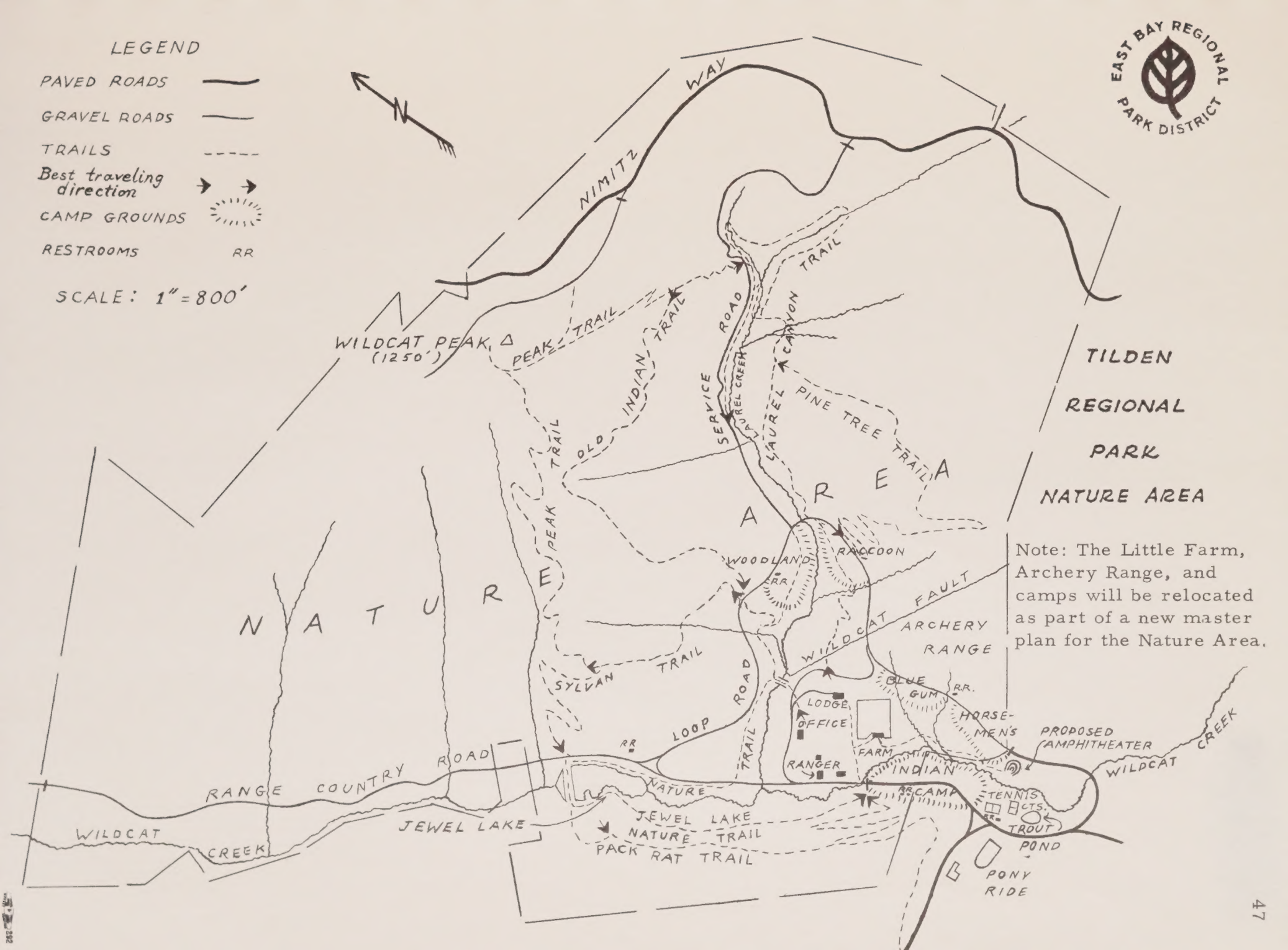
Audio-Visual Materials

Motion Pictures:
California: Geography, Weather, Water, 20 minutes, gd. 4 up
California - The Valleys, 10 minutes, gd. 4 up
Earthquakes and Volcanoes, 13 minutes, gd. 4 up
Fossils are Interesting, 10 minutes, gd. 4 up
Fountain of Life (Water Cycle), 10 minutes, gd. 4 up
Guardians of the Wild (Forest Rangers), 10 minutes, gd. 5 up
Meaning of Conservation, 11 minutes, gd. 4 up
Nature Next Door (Suitable for Tilden trip follow-up), 28 minutes, gd. 4 up
Our Weather, 11 minutes, gd. 5 up
Water in the Air, 10 minutes, gd. 3 up
What Makes Rain, 10 minutes, gd. 3 up

Filmstrips:
About Our Earth, gd. 4 up
Air and Life, gd. 3 up
Animal Life and the Soil, gd. 5 up
Be Your Own Weather Man, gd. 4 up
California - Climate, gd. 4 up
California - Physical Environment, gd. 4 up
Forest Resources, gd. 5 up
How Soil is Formed, gd. 5 up
Life in Ponds, Lakes, and Streams, gd. 5 up
Our Changing Earth, gd. 4 up
Plants Help Us, gd. 3 up
Soil and Its Uses, gd. 3 up
Soil Resources, gd. 5 up
Water and the Soil, gd. 5 up
Water and Its Importance, gd. 4 up
Water in Weather, gd. 4 up
What is Weather, gd. 3 up
What Makes Rain, gd. 3 up
What Makes the Weather, gd. 5 up

Charts:
Geographical Terms

*Materials available in every elementary school


LEGEND
PAVED ROADS
GRAVEL ROADS
TRAILS
Best traveling direction
CAMP GROUNDS
RESTROOMS RR
SCALE: 1" = 800'
EAST BAY REGIONAL PARK DISTRICT
TILDEN REGIONAL PARK NATURE AREA
Note: The Little Farm, Archery Range, and camps will be relocated as part of a new master plan for the Nature Area.
NIMITZ WAY
WILDCAT PEAK △ (1250')
PEAK TRAIL
OLD INDIAN TRAIL
SERVICE ROAD
LAUREL CREEK
LAUREL CANYON TRAIL
PINE TREE TRAIL
NATURE AREA
PEAK TRAIL
WOODLAND
RR
RACCOON
WILDCAT FAULT
ARCHERY RANGE
SYLVAN TRAIL
LOOP ROAD
TRAIL
BLUE GUM
RR
LODGE
OFFICE
HORSE-MEN'S
PROPOSED AMPHITHEATER
WILDCAT CREEK
RR
FARM
RANGER
INDIAN
NATURE
RR CAMP
TENNIS CTS.
TROUT POND
PONY RIDE
RANGE COUNTRY ROAD
WILDCAT CREEK
JEWEL LAKE
JEWEL LAKE NATURE TRAIL
PACK RAT TRAIL

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